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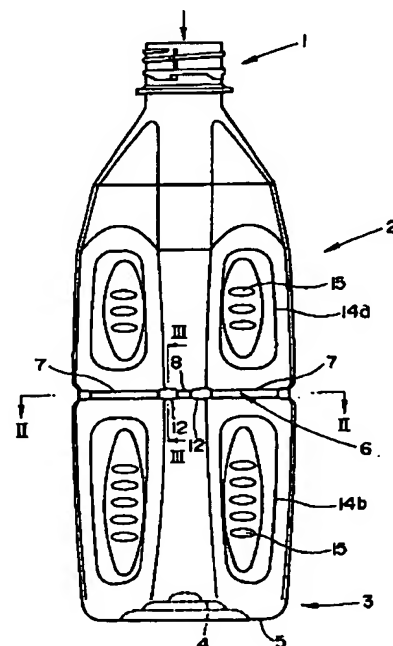
(54) 【発明の名称】 合成樹脂製ボトル

(57) 【要約】

【課題】 縦方向の耐圧縮性に優れた角形の合成樹脂製ボトルを提供する。

【解決手段】 口部1と、口部1の下方に二軸延伸されて横断面が略四角形状に形成された胴部2と、胴部2の下部を形成する底部3と、底部3から胴部2内に膨出する凹部4とを備え、胴部2の中間部に底面5と平行な周溝6を備える。胴部2の横断面は4本の各長辺7の間に4本の短辺8を配してなる略八角形状であって、長辺7と短辺8との比が1:0.2~1:0.8の間にある。長辺7と短辺8との各接続部に周溝6の底部11から胴部2の外側に向けて周溝6内で膨出し、ボトルの上下方向に延在する半円柱状の膨出部12を設ける。

FIG. 1





## 【特許請求の範囲】

【請求項1】口部と、口部の下方に二軸延伸されて横断面が略四角形状に形成された胴部と、胴部の下部を形成する底部と、該底部から該胴部内に膨出する凹部とを備え、該胴部の中間部に底面と平行な周溝を備える角形の合成樹脂製ボトルにおいて、  
該胴部の横断面は4本の各長辺の間に4本の短辺を配してなる略八角形状であって、該長辺と短辺との比が1:0.2~1:0.8の間にあり、該長辺と短辺との各接続部に該周溝の底部から該胴部の外側に向けて該周溝内で膨出し、ボトルの上下方向に延在する半円柱状の膨出部を設けたことを特徴とする合成樹脂製ボトル。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、胴部に底面と平行な周溝を備える角形の合成樹脂製ボトルに関するものである。

## 【0002】

【従来の技術】従来、ウーロン茶、ミネラルウォーター等の清涼飲料の容器としてポリエチレンテレフタレート樹脂等の合成樹脂をブロー成形により二軸延伸してなる飲料容器が用いられている。前記飲料容器として、図4及び図5に示すように、口部1と、口部1の下方に二軸延伸された胴部2を備え、胴部2の横断面が略四角形状、より正確には、前記四角形の頂点が面取りされて、4本の長辺7の間に4本の短辺8を配してなる略八角形状に形成されているものが知られており、このような飲料容器は一般に角形飲料容器と呼ばれている。

【0003】前記角形飲料容器は、さらに、前記胴部2の下部を形成する底部3と、該底部3から該胴部2内に膨出する凹部4とを備え、該凹部4の外周部の底面5を接地面として直立させるようになっている。また、前記角形飲料容器では、内容物、製造者等の表示や、容器に美粧性を付与する目的で前記胴部2の上部にシュリンクラベルが装着されるが、該シュリンクラベルの脱落を防止するために前記胴部2の略中央部に前記底面と平行な周溝6が設けられている。そして、前記シュリンクラベルの下端部が前記周溝6に係止されるようになっている。

【0004】しかしながら、前記周溝6を設けた前記角形飲料容器は縦方向に圧縮されると、前記周溝6から内側に折れ曲がる可能性があるという不都合がある。

## 【0005】

【発明が解決しようとする課題】本発明は、かかる不都合を解消して、縦方向の耐圧縮性に優れた角形の合成樹脂製ボトルを提供することを目的とする。

## 【0006】

【課題を解決するための手段】前記角形飲料容器は縦方向に圧縮されると、その応力が前記略八角形状の各コーナー部に集中する。つまり、あたかも前記略八角形状の

各コーナー部が、8本の柱の如く角形容器を支持するわけであるが、前記の底面5に平行な周溝6が設けられた前記従来の角形飲料容器では、略八角形状の各コーナー部における周溝6部分に前記応力が集中してしまい、図6に仮想線示するように、この部分でボトル内面側に折れ曲がる座屈変形が生じやすくなるものと考えられる。

【0007】そこで、本発明の合成樹脂製ボトルは、口部と、口部の下方に二軸延伸されて横断面が略四角形状に形成された胴部と、胴部の下部を形成する底部と、該底部から該胴部内に膨出する凹部とを備え、該胴部の中間部に底面と平行な周溝を備える角形の合成樹脂製ボトルにおいて、該胴部の横断面は4本の各長辺の間に4本の短辺を配してなる略八角形状であって、該長辺と短辺との比が1:0.2~1:0.8の間にあり、該長辺と短辺との各接続部に該周溝の底部から該胴部の外側に向けて該周溝内で膨出し、ボトルの上下方向に延在する半円柱状の膨出部を設けたことを特徴とする。

【0008】前記構成を備える本発明の合成樹脂製ボトルでは、前記八角形の各頂点に当たる前記長辺と短辺との接続部の前記周溝に、前記半円柱状の膨出部が設けられているので、該ボトルが縦方向の圧縮により前記の様に變形されたときに、前記膨出部により前記縦方向の圧縮力に対抗することができ、優れた耐圧縮性を得ることができる。

【0009】本発明の合成樹脂製ボトルにおいて、前記長辺の長さを1とするときに、該長辺に対する前記短辺との比が0.2未満では、ブロー成形の際に前記長辺と前記短辺との延伸倍率の差が大きくなって、前記短辺に過延伸によるクレージングが生じたり、逆に前記長辺に低延伸による肉溜まりが生じやすくなるなど、成形性が低くなる。また、前記長辺に対する前記短辺との比が0.8より大きいと、外観形状が正八角形状に近くなり、ボトルの各側面の幅（前記長辺及び短辺に相当する）が略等しい長さになるので、製造ライン上での方向規制が困難になり、あるいは前記シュリンクラベルを装着する際に印刷正面とボトル面との不一致、ケーサーによるケース詰め の困難等の不都合が生じる。

## 【0010】

【発明の実施の形態】次に、添付の図面を参照しながら本発明の実施の形態についてさらに詳しく説明する。図1は本実施形態の合成樹脂製ボトルの正面図であり、図2は図1のI-I線断面図、図3は図1のI-I-I-I線断面図である。

【0011】本実施形態の合成樹脂製ボトルは、図1示のように、ポリエチレンテレフタレート（PET）樹脂をブロー成形により二軸延伸してなる角形PETボトルであり、口部1に連なる胴部2の下部を底部3とし、底部3から胴部2内に膨出する凹部4を備えている。前記PETボトルは、凹部4の外周部を平坦な底面5とし、該底面5により接地して直立することができる。



【0012】図1示のPETボトルは胴部2の略中央部に底面5と平行な周溝6を備え、図2示のように、胴部2の横断面は4本の長辺7の間に4本の短辺8を配してなる略八角形状であって、長辺7の長さAと短辺8の長さBとの比(A:B)が1:0.2~1:0.8の間にある。胴部2の横断面は、略四角形状の外観を付与するために、前記長辺7の長さAと短辺8の長さBとの比(A:B)が1:0.25~1:0.35の間にあることが好ましく、本実施形態ではA:B=1:0.29となっている。

【0013】前記周溝6は縦断面の形状が図3に示す様に逆台形になっている。そして、周溝6の長辺7と短辺8との接続部には、図2示のように、周溝6の底部11から胴部2の外側に向けて周溝6内で膨出する半円柱状の膨出部12が設けられている。前記膨出部12は、周溝6内で、前記PETボトルの上下方向に延在して設けられている。

【0014】尚、図1示のPETボトルは、胴部2の長辺7を形成する側面に、上縁が略四角形で底縁が楕円形になっている浅い凹部14a、14bが設けられており、凹部14a、14bの底部にはさらに横方向の楕円形のピード15がそれぞれ複数設けられて、PETボトル自体に意匠性を付与している。

【0015】前記PETボトルを図1に矢示する方向から\*

※ら圧縮すると、図3に仮想線示するように、逆台形の周溝6の8つのコーナー部のいずれかが、ボトル内面側に変形する。このとき、図1示のPETボトルでは図3示のように、周溝6のボトル内面側への変形量が小さいが、図4示の従来のPETボトルでは、前記周溝6のコーナー部のいずれかの強度が前記縦方向の圧縮力に耐えきれなくなって、図6に仮想線示するように前記周溝6の部分で座屈変形が生じ、この部分でボトル内面側への折れ曲がり16が生じる。

10 【0016】そこで、次に、図2示のように周溝6に膨出部12を設けたPETボトル(実施例)と、図5示の様に周溝6に膨出部を全く設けない以外は前記実施形態と同一形状のPETボトル(比較例)とを縦方向に圧縮し、前記折れ曲がりが生じたときの強度を降伏強度として測定した。

【0017】試料のPETボトルは容量500ミリリットル、重量23グラムであり、空の場合(空ボトル)と、20℃の水を充填してキャップをした場合(充填ボトル)とについて、測定温度20℃で、それぞれ圧縮試験機を用いて50mm/分で圧縮した。供試PETボトルは、実施例、比較例とも各10本とし、前記降伏強度の最大値、最小値、平均値を表1に示す。

【0018】

【表1】

	空ボトルの降伏強度(kg)			充填ボトルの降伏強度(kg)		
	最大値	最小値	平均値	最大値	最小値	平均値
実施例	27.7	25.2	26.4	31.4	26.9	30.0
比較例	22.5	19.5	21.0	21.6	20.6	21.8

【0019】表1から明らかなように、図2示の膨出部12を設けた本実施例のボトルによれば、図5示の膨出部を全く設けない比較例のボトルよりも優れた降伏強度が得られ、縦方向の耐圧縮性に優れていることが明らかである。

【図面の簡単な説明】

【図1】本実施形態の合成樹脂製ボトルの正面図。

【図2】図1のI-I線断面図。

※

※【図3】図1のI-I線断面図。

【図4】従来の合成樹脂製ボトルの正面図。

【図5】図4のV-V線断面図。

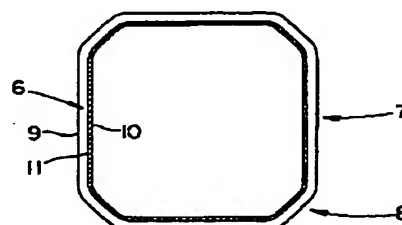
【図6】図4のVI-VI線断面図。

【符号の説明】

1…口部、 2…胴部、 3…底部、 4…凹部、 6…周溝、 7…長辺、 8…短辺、 12…膨出部。

【図5】

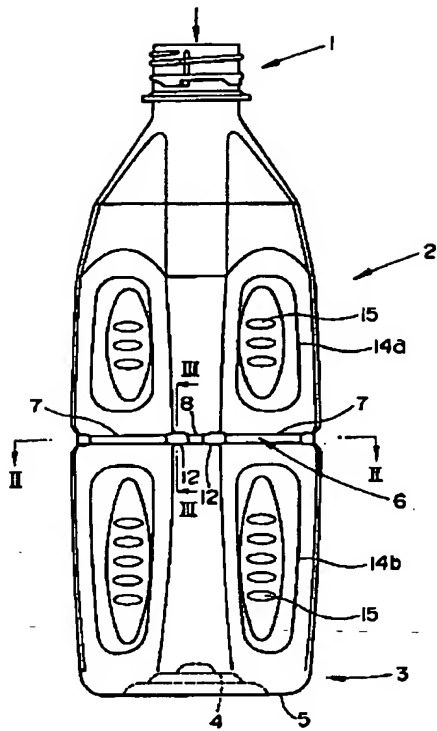
FIG. 5





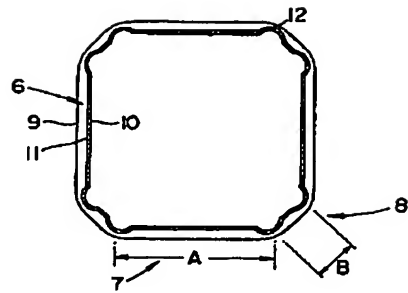
【図1】

FIG. 1



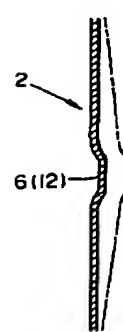
【図2】

FIG. 2



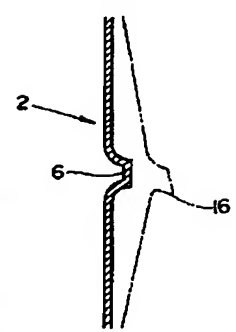
【図3】

FIG. 3



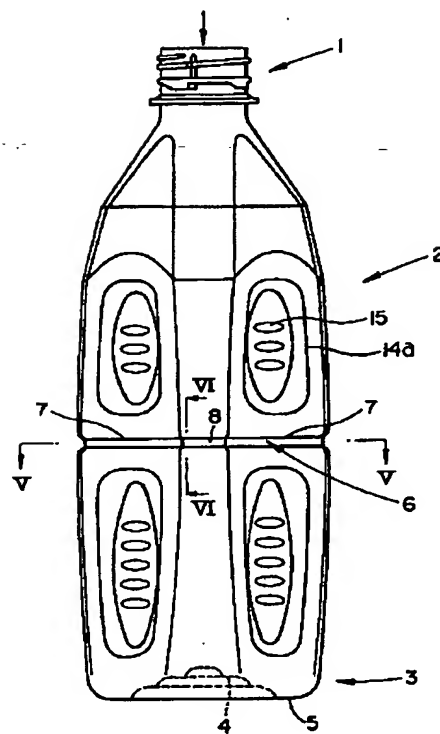
【図6】

FIG. 6



【図4】

FIG. 4





## BOTTLE MADE OF SYNTHETIC RESIN

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Inventor: TOMIZAWA KATSUMASA; SAKURAI YASUFUMI;  
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Applicant: HOKKAI CAN

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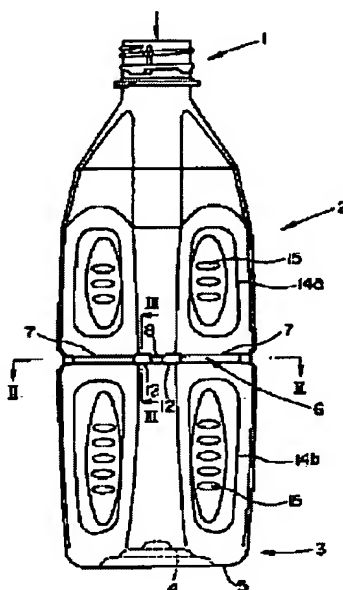
Application number: JP19970113942 19970501

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### Abstract of JP10305823

**PROBLEM TO BE SOLVED:** To provide a rectangular bottle made of a synthetic resin, excellent in compressive resistance in a vertical direction. **SOLUTION:** This bottle made of a synthetic resin has a mouth 1, a body 2 biaxially oriented and formed underneath the mouth 1 into a substantially square shape in a cross section, a bottom 3 forming a lower part of the body 2, and a recessed portion 4 swollen inside the body 2 from the bottom 3, and further has, at an intermediate portion of the body 2, a circumferential groove 6 parallel to a bottom face 5. A cross section of the body 2 has a substantially octagonal shape formed by disposing four shorter sides 8 among respectively adjacent four longer sides 7, and the ratio of each longer side 7 to each shorter side 8 is in a range of 1 to 0.2-1 to 0.8. Each semicolumnar swollen portion 12 swelling inside the circumferential groove 6 from a bottom 11 of the circumferential groove 6 toward the outside of the body 2 and extending in the vertical direction of the bottle is provided at each connection between the longer side 7 and the shorter side 6.



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**CLAIMS**

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[Claim(s)]

[Claim 1] The regio oralis and the drum section in which biaxial stretching was carried out under the regio oralis, and the cross section was formed in the shape of an abbreviation square, In the bottle made of synthetic resin of the square shape which is equipped with the pars basilaris ossis occipitalis which forms the lower part of a drum section, and the crevice which bulges in this drum section from this pars basilaris ossis occipitalis, and equips the pars intermedia of this drum section with a circumferential groove parallel to a base The cross section of this drum section has the shape of an abbreviation octagon which comes to allot four shorter sides among each four long sides. The bottle made of synthetic resin characterized by preparing the bulge section of the shape of a semicircle column to which the ratio of this long side and a shorter side is among 1:0.2 to 1:0.8, bulges within this circumferential groove towards the outside of this drum section from the pars basilaris ossis occipitalis of this circumferential groove in each connection of this long side and a shorter side, and extends in the vertical direction of a bottle.

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[Translation done.]

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a base and the bottle made of synthetic resin of a square shape equipped with an parallel circumferential groove at a drum section.



[0002]

[Description of the Prior Art] Conventionally, the drink container which comes to carry out biaxial stretching of the synthetic resin, such as polyethylene terephthalate resin, by blow molding as a container of soft drinks, such as oolong tea and mineral water, is used. As said drink container, as shown in drawing 4 and drawing 5, it has the regio oralis 1 and the drum section 2 by which biaxial stretching was carried out under the regio oralis 1. The cross section of a drum section 2 to the shape of an abbreviation square, and twist accuracy The top-most vertices of said square are beveled, what is formed among four long sides 7 in the shape of [ which comes to allot four shorter sides 8 ] an abbreviation octagon is known, and, generally such a drink container is called the square shape drink container.

[0003] Said square shape drink container is further equipped with the pars basilaris ossis occipitalis 3 which forms the lower part of said drum section 2, and the crevice 4 which bulges in this drum section 2 from this pars basilaris ossis occipitalis 3, and uprights the base 5 of the periphery section of this crevice 4 as a ground plane. Moreover, with said square shape drink container, the upper part of said drum section 2 is equipped with a shrink label in order to give beautiful decoration nature to a display of contents, a manufacturer, etc., and a container, but in order to prevent omission of this shrink label, the circumferential groove 6 parallel to said base is formed in the abbreviation center section of said drum section 2. And the lower limit section of said shrink label is stopped by said circumferential groove 6.

[0004] However, having un-arranged [ that it may bend inside from said circumferential groove 6 ], when said square shape drink container which formed said circumferential groove 6 is compressed by the lengthwise direction.

[0005]

[Problem(s) to be Solved by the Invention] This invention cancels this un-arranging and aims at offering the bottle made of synthetic resin of the square shape excellent in the compressibility-proof of a lengthwise direction.

[0006]

[Means for Solving the Problem] If said square shape drink container is compressed by the lengthwise direction, the stress will concentrate it on each corner section of the shape of said abbreviation octagon. That is, although each corner section of the shape of said abbreviation octagon supports a square shape container like eight columns, with said conventional square shape drink container in which the circumferential groove 6 parallel to the aforementioned base 5 was formed, said stress concentrates on circumferential groove 6 part in each abbreviation octagon-like corner section, and it is thought that it becomes easy to produce the buckling distortion which bends to a bottle inside side in this part so that it may \*\*\*\*\* to drawing 6.

[0007] Then, the drum section in which biaxial stretching of the bottle made of synthetic resin of this invention was carried out under the regio oralis and the regio oralis, and the cross section was formed in the shape of an abbreviation square, In the bottle made of synthetic resin of the square shape which is equipped with the pars basilaris ossis occipitalis which forms the lower part of a drum section, and the crevice which bulges in this drum section from this pars basilaris ossis occipitalis, and equips the pars intermedia of this drum section with a circumferential groove parallel to a base The cross section of this drum section has the shape of an abbreviation octagon which comes to allot four shorter sides among each four long sides. The ratio of this long side



and a shorter side is among 1:0.2 to 1:0.8, bulges within this circumferential groove towards the outside of this drum section from the pars basilaris ossis occipitalis of this circumferential groove in each connection of this long side and a shorter side, and is characterized by preparing the bulge section of the shape of a semicircle column which extends in the vertical direction of a bottle.

[0008] With the bottle made of synthetic resin of this invention equipped with said configuration, since the bulge section of the shape of said semicircle column is prepared in said circumferential groove of the connection of said long side and shorter side which hit each top-most vertices of said octagon, when this bottle is transformed as mentioned above by compression of a lengthwise direction, the compressive force of said lengthwise direction can be opposed by said bulge section, and the outstanding compressibility-proof can be acquired.

[0009] In the bottle made of synthetic resin of this invention, when setting the die length of said long side to 1, the difference of the draw magnification of said long side and said shorter side becomes [ a ratio with said shorter side to this long side ] large less than by 0.2 in the case of blow molding, and the crazing by fault extension arising in said shorter side, or becoming easy to produce the \*\*\*\* ball by low extension in said long side conversely and a moldability become low. moreover -- if a ratio with said shorter side to said long side is larger than 0.8 -- an appearance configuration -- the shape of a regular octagon -- near -- becoming -- the width of face (it is equivalent to said long side and shorter side) of each side face of a bottle -- abbreviation -- since it becomes equal die length, in case the direction regulation on a production line becomes difficult or it equips with said shrink label, un-arranging, such as an inequality of a printing transverse plane and a bottle side and difficulty of case stuffing by KESA, arise.

[0010]

[Embodiment of the Invention] Next, it explains in more detail about the gestalt of operation of this invention, referring to an attached drawing. Drawing 1 is the front view of the bottle made of synthetic resin of this operation gestalt, drawing 2 is the II-II line sectional view of drawing 1, and drawing 3 is the III-III line sectional view of drawing 1.

[0011] Like \*\*1\*\*, the bottle made of synthetic resin of this embodiment is a square shape PET bottle which comes to carry out biaxial stretching of the polyethylene terephthalate (PET) resin by blow molding, made the lower part of the drum section 2 which stands in a row in the regio oralis 1 the pars basilaris ossis occipitalis 3, and is equipped with the crevice 4 which bulges in a drum section 2 from a pars basilaris ossis occipitalis 3. By using the periphery section of a crevice 4 as the flat base 5, said PET bottle can be grounded by this base 5, and can stand straight.

[0012] The PET bottle of \*\*1\*\* equips the abbreviation center section of the drum section 2 with a base 5 and the parallel circumferential groove 6, like \*\*2\*\*, among four long sides 7, the cross section of a drum section 2 has the shape of an abbreviation octagon which comes to allot four shorter sides 8, and the ratio (A:B) of die-length A of a long side 7 and die-length B of a shorter side 8 is among 1:0.2 to 1:0.8. In order that the cross section of a drum section 2 may give an abbreviation square-like appearance, it is desirable that the ratio (A:B) of die-length A of said long side 7 and die-length B of a shorter side 8 is among 1:0.25 to 1:0.35, and it has become A:B=1:0.29 with this operation gestalt.

[0013] Said circumferential groove 6 has a reverse trapezoid, as the configuration of the



longitudinal section shows drawing 3 . And the bulge section 12 of the shape of a semicircle column which bulges within a circumferential groove 6 towards the outside of a drum section 2 from the pars basilaris ossis occipitalis 11 of a circumferential groove 6 is formed in the connection of the long side 7 of a circumferential groove 6, and a shorter side 8 like \*\*2\*\* . Said bulge section 12 is extended and formed in the vertical direction of said PET bottle within the circumferential groove 6.

[0014] In addition, the shallow crevices 14a and 14b where an upper limb has the side face which forms the long side 7 of a drum section 2, and the bottom edge has an ellipse form with the abbreviation square are formed, two or more beads 15 of a lateral ellipse form were further formed in the pars basilaris ossis occipitalis of Crevices 14a and 14b, respectively, and the PET bottle of \*\*1\*\* has given design nature to the PET bottle itself.

[0015] If it compresses from the direction which \*\*\*\* said PET bottle to drawing 1 , either of the eight corner sections of the circumferential groove 6 of a reverse trapezoid will deform into a bottle inside side so that it may \*\*\*\*\* to drawing 3 . Although the deformation by the side of the bottle inside of a circumferential groove 6 is small like \*\*3\*\* with the PET bottle of \*\*1\*\* at this time, in the conventional PET bottle of \*\*4\*\* , buckling distortion arises in the part of said circumferential groove 6 so that it may become impossible for one reinforcement of the corner sections of said circumferential groove 6 to be able to finish bearing the compressive force of said lengthwise direction and it may \*\*\*\*\* to drawing 6 , and bending [ 16 ] by the side of a bottle inside arises in this part.

[0016] then -- next, the PET bottle (example) which formed the bulge section 12 in the circumferential groove 6 like \*\*2\*\* , and except not preparing the bulge section in a circumferential groove 6 at all like \*\*5\*\* , the PET bottle (example of a comparison) of the same configuration as said operation gestalt was compressed into the lengthwise direction, and reinforcement when said bending arises was measured as yield strength.

[0017] The PET bottle of a sample was 23g in the capacity of 500ml, and weight, about the case (empty bottle) of empty, and the case (restoration bottle) where it caps by being filled up with 20-degree C water, is 20 degrees C in measurement temperature, and was compressed by part for 50mm/using the compression tester, respectively. It makes a sample offering PET bottle each into ten also with an example and the example of a comparison, and it shows the maximum of said yield strength, the minimum value, and the average in Table 1.

[0018]

[Table 1]

	空ボトルの降伏強度 (k g)			充填ボトルの降伏強度 (k g)		
	最大値	最小値	平均値	最大値	最小値	平均値
実施例	27.7	25.2	26.4	31.4	26.9	30.0
比較例	22.5	19.5	21.0	21.6	20.6	21.8

[0019] According to the bottle of this example which formed the bulge section 12 of \*\*2\*\* , it is clear for the yield strength superior to the bottle of the example of a comparison which does not prepare the bulge section of \*\*5\*\* at all to be obtained, and



to excel in the compressibility-proof of a lengthwise direction so that clearly from Table 1.

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[Translation done.]

\* NOTICES \*

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

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#### DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The front view of the bottle made of synthetic resin of this operation gestalt.

[Drawing 2] The II-II line sectional view of drawing 1 .

[Drawing 3] The III-III line sectional view of drawing 1 .

[Drawing 4] The front view of the conventional bottle made of synthetic resin.

[Drawing 5] The V-V line sectional view of drawing 4 .

[Drawing 6] The VI-VI line sectional view of drawing 4 .

[Description of Notations]

1 -- Regio oralis 2 -- Drum section 3 -- Pars basilaris ossis occipitalis 4 -- Crevice 6 -- Circumferential groove 7 [ 12 -- Bulge section. ] -- A long side, 8 -- Shorter side

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[Translation done.]

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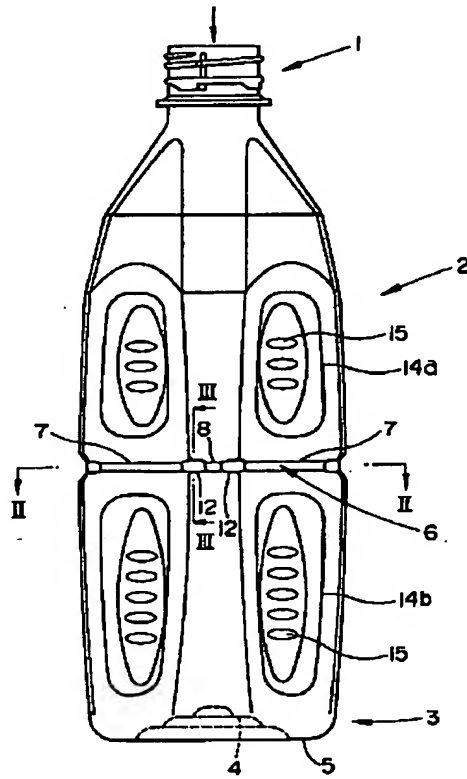
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DRAWINGS

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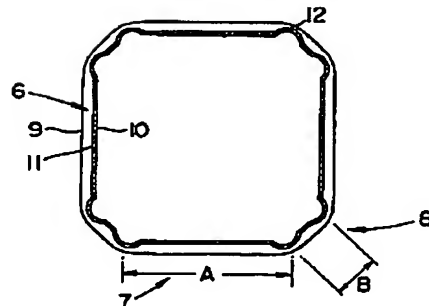
[Drawing 1]

FIG. 1



[Drawing 2]

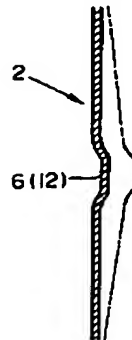
FIG. 2





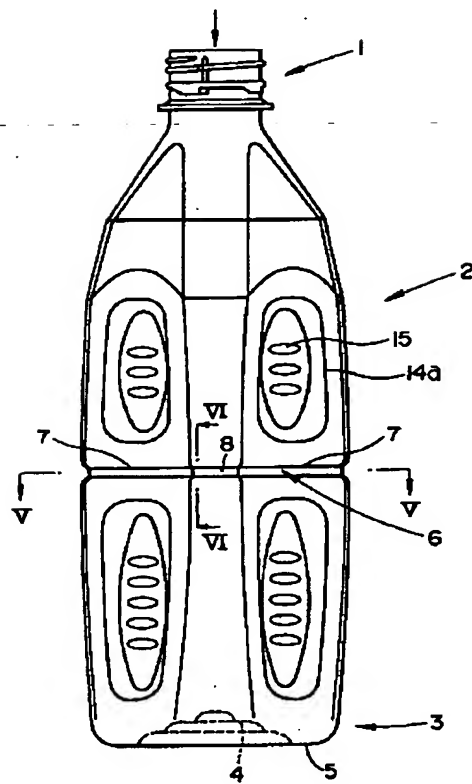
[Drawing 3]

FIG. 3



[Drawing 4]

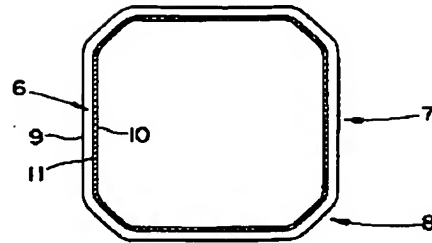
FIG. 4





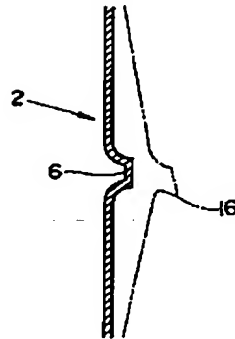
[Drawing 5]

FIG. 5



[Drawing 6]

FIG. 6



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[Translation done.]